Introduction

Edison created what is known as the "teamwork" laboratory. He believed that inventions and research could best be accomplished by great minds working together. His laboratory is the basis for the majority of our current laboratories and research development places. While he didn't invent teamwork, he made it popular. Until Edison, most inventors worked by themselves for many years, sometimes giving up because they couldn't solve problems by themselves.

A good example of this is the light bulb. Since 1802, over 20 different inventors had been working to solve the problem of lighting the world. Most of them had been working by themselves and weren't using the other inventors' research or solutions. When Edison set out to create the light bulb, he encouraged the inventors and scientists who worked for him to concentrate on this single problem. Suddenly, there were ten people working on the problem instead of just one. Ten people working meant ten times the amount of time and energy and the "cross-pollination" of ideas, which improved the chances of success more than tenfold.

Everyone seems to agree that Thomas Edison was also a man of persistence. He had a high persistence threshold. He wanted to make a light using electricity. Apparently the solution was to pass a current through a thin wire, a filament, and have it glow. But what filament? Edison tried hundreds of different materials before finding a thin strand of the material that worked.

This video on Thomas Edison is about using teamwork and persistence in science and science fair projects. In the video two very different girls learn they have to work together to get the job done. Is there anyone in your class with whom you work especially well? Is there anyone in your class that you think you wouldn't work with well? Why? Do you think your differences could make a better team? When do you think teamwork is a good idea? Is there ever a time when it is a bad idea? Have you ever had to work on a team that didn't work well? Why do you think that happened? What could you have done to keep that from happening?

How to Use These Files

This dramatization is a springboard to launch a whole study discussing perseverance, teamwork and science fair projects. Teaching ideas and historical background included in this guide are available to supplement your study.

If your students are younger, the following sections are designed especially for you:

- A section of the classroom activities
- A special section on teamwork.

If your students are older, the following sections are designed especially for you:

- A section of the classroom activities
- A science fair vocabulary section
- A section of essay topics.

All students and teachers will be interested in the following sections:

- A short biography highlighting some of Edison's important inventions and accomplishments, including a timeline of important events.
- A Video Quiz is included on the middle page that can be copied for classroom use.
- A how-to guide for your science fair projects.
- A webpage internet connection a valuable resource for classroom updates.
- A section listing various museums and libraries devoted to Edison.

The Life of Thomas Edison

"Genius is 1% inspiration and 99% perspiration."
Thomas Edison

Edison was an inventor known for his influence, his intelligence and, most importantly, his perseverance. During his lifetime more than a thousand American patents were granted on work of his own or of teams under his supervision. Three of his inventionsthe phonograph, a practical incandescent light and electric system, and a moving picture camerahelped found giant industries that were to change the life and leisure of the world. In other areas Edison managed to affect over twenty industries including the military, medical fields (with his fluoroscope), the stock market and mining. Following is a short biography and a timeline of his greatest accomplishments.

Inspiring Childhood. Thomas Edison, the youngest of seven children, was born in Milan, Ohio, on February 11, 1847, to Samuel and Nancy Edison. Home schooled and an avid reader, Edison began his scientific experiments at the age of ten when he built a laboratory in the basement of his house stocked with chemicals he either bought or found in the town dump. Edison's early experimentation was almost stopped when his mother became tired of bad odors and fumes filling the house.

The Tramp Telegrapher. Edison left the laboratory behind for a career as a "candy butcher" on the Grand Trunk Railway in 1859, selling candy, dried fruit, snacks and newspapers. Three years later he made history when he began to publish his own newspaper, the *Weekly Herald*, aboard the train. The first newspaper to be published aboard a moving train, the *Weekly Herald*, was printed on a secondhand printing press Edison set up in the baggage car of the train. In 1863, he began his first career as a "tramp telegrapher," going from place to place including Ontario, Cincinatti and Nashville, offering his skills as a telegrapher. He finally settled in Boston, working the New York wire for Western Union.

Learning to be Practical. It was in Boston that Edison began experimenting in a more professional way than ever before, first studying Michael Farady's writings on electricity. His first patent in 1868, was a vote recorder which sped up, through electrical messages, the counting of votes for assemblies and meetings. Finding no buyer for his first invention, he formed a policy to never attempt to invent anything unless he was sure there was a commercial demand for it. His next invention demonstrated his commitment to this ideal, a stock ticker that would bring brokers Wall Street quotations more quickly.

Pure Science Experiments. With two notable exceptions, Edison rarely dabbled in anything other than the practical application of principles and scientific theories. In 1875, while working on a theory of electromagnets and telegraphy, Edison discovered a type of energy between electromagnetism and heat and light. Named "etheric force," this discovery revealed the existence of the electromagnetic wave and prompted the invention of the radio in the 1890's. The second time was with his discovery of the "Edison Effect," the basis for the whole field of electronics. Edison discovered that a valve could be

created for an electronic current by inserting a metal plate within the filament of an electric light bulb.

The Menlo Park Laboratory. Edison's laboratory at Menlo Park, New Jersey became the first of its kind, the original organized technical research laboratory, with its research "team." Inventions that came out of this new research include the mimeograph machine, the phonograph, the light bulb, and many others.

First of the Great Inventions The phonograph, the light bulb and the motion picture camera have long been considered Edison's greatest inventions. The phonograph, the first of these inventions, was developed after Edison began work on improving Alexander Graham Bell's telephone. Edison believed that the phonograph (which has changed very little from its original design) was his greatest invention. Interestingly enough, the phonograph is the only invention for which Edison can claim sole ownership.

Early Movie Business. Other inventors were experimenting with the motion-picture camera when, in 1891, Edison came up with the practical movie camera, or the Kinetograph ("moving writing"), and a projector, the Kinetoscope ("moving view"), to show his movies. The first movie studio built in 1893, was his Black Maria at West Orange, New Jersey. Edison, who had been working unsuccessfully on "talkies" by combining the phonograph and the camera, left the motion picture business when the industry started to turn away from the educational purpose he saw for it and towards entertainment. Edison was quoted as saying " A good many people seemed to wonder why I did so [quit the movie business] maybe they still wonder. But the answer is simple enough. I was an inventor an experimenter. I wasn't a theatrical producer. And I had no ambitions to become one." Incidentally, movie audiences would not hear the human voice on film until 1927 with Al Jolson's *The Jazz Singer*.

The Light Bulb. Edison is quoted as saying it would take a matter of a few weeks to invent the bulb. In reality, it would take him almost two years of failed attempts, new discoveries and prototypes before he would find success. It is said he tried over 6,000 different carbonized plant fibers, looking for a carbon filament for his light bulb. By concentrating and inventing a whole lighting system rather than just a single light bulb, Edison succeeded where others had failed. Edison chose to look at the big picture and created a lighting system including wiring, plugs, connectors, etc., to operate more than one light bulb at once. Fighting other inventors in courts from England to America, Edison struggled for years to claim his rightful title of inventor of the light bulb, possibly his most popular invention.

Military Inventions of the War Years! During World War I, Edison became the head of the Naval Consulting Board, and for three years he worked on inventions to help the U. S. Navy. Working on antisubmarine tactics, Edison worked to combat the Germans in the Atlantic wars. His inventions included devices that could detect torpedoes as soon as they were fired, a loud-speaking telephone so that a conversation could be carried on in the middle of a battle, and a glare eliminator to make it possible for ships to see periscopes with the bright sunlight shining on the water.

Medical Breakthroughs In 1896, Edison invented the practical fluoroscope, a machine which included a screen made out of tungstate of calcium on which you view X-rays. Edison refused to take a patent out on his fluoroscope because he wanted to see it in use, helping people, immediately. The fluoroscope enabled surgeons to perform the first x-ray operation in the United States.

The Perseverant Inventor One of Edison's most famous qualities was his perseverance. While working on the nickel/iron storage battery, he performed 10,296 experiments. Throughout his inventing career, Edison followed almost every unsuccessful venture with a successful idea. He stuck to his creed of working on only useful and wanted inventions and changed the world with his drive for success. When Edison died October 18, at his home in West Orange, New Jersey, he left behind a legacy of breakthroughs in technology and science.

Edison's Important Events

1847 Thomas Alva Edison is born on February 11, in Milan, Ohio.
1859 Edison sells newspapers and candy on Port Huron to Detroit trains.
1862 Edison publishes the first newspaper printed aboard a moving train.
1868 Edison gains his first patent, for his electrical vote recorder.
1869 Edison invents the stock ticker.
1871 Edison marries Mary Stilwell.
1874 He invents the quadruplex telegraph.
1875 He discovers the "etheric force," which leads to Marconi's radio.
1876 Edison establishes the first laboratory devoted to industrial research at Menlo Park, New Jersey.
1877 He invents the phonograph and the carbon-button telephone transmitter.
1879 The first practical incandescent electric light bulb is given a public demonstration with the illumination of Menlo Park.
1880 He perfects a system of electrical distribution.
1881 Edison moves bulk of operations to New York City and begins installation of an electrical distribution system.
1882 Edison opens the first power and lighting station in London.
1883 The discovery of the "Edison Effect" leads to the science of electronics.
1886 Edison marries Mina Miller after Stilwell dies.
1887 Edison moves his laboratory to West Orange, New Jersey.
1888 Edison begins ore-milling experiments.
1889 He begins development of motion picture devices the kinetograph and kinetoscope.
1891 Edison perfects his motion picture camera.
1893 Shooting begins at The Black Maria, the first film studio.

1896	Edison invents the practical fluoroscope, which enables surgeons to perform the first x-ray operation in the United States and introduces a new spring-motor phonograph.
1901	He constructs his cement plant in New Jersey.
1903	He perfects long kilns (ovens) that produce superior cement. THE GREAT TRAIN ROBBERY, the first feature film is released.
1905	Edison reintroduces a dictating machine.
1908	The Motion Picture Patents Company is formed.
1909	Edison perfects a practical nickel-iron storage battery.
1912	He tries to develop auto ignition system for Henry Ford.
1915	He becomes the head of the Naval Consulting Board, working for 3 years on inventions to help the U.S. Navy during World War I.
1918	Edison ends his involvement in motion pictures.
1927-29	He experiments with rubber at his Fort Meyers laboratory, undertaking a search for a domestic source of rubber.
1931	Edison dies on October 18, at his home in West Orange, New Jersey.

Who Invented It?

Just who did invent the light bulb? Edison was not the first to work on the light bulb; in fact, for fifty years inventors in twenty-one countries had been working on the incandescent light bulb idea. Many of these inventors had working versions of their light bulbs. Some had lit residences, and others had kept the bulbs burning for a record twenty-four hours at a time.

All these inventors had one common problem though; they were working on too small of a scale. Only Edison designed his light bulb from the beginning to be part of a large system, thereby allowing him to create a functioning bulb and cementing his name as inventor of the incandescent light bulb. It was this insight into the lighting world that provided the key to the light bulb. It was the needs of the whole system that determined the size of the burner and the length of the filament in the light bulb, not the needs of a single bulb.

In 1879, Edison requested a patent for a light bulb that had supposedly burned for forty hours, and history was made, history that would be followed by years of court battles over the true inventor. In reality, Edison couldn't claim to be the sole inventor of the light bulb because he had studied other's work on the invention. He had not used any materials that had not already been tested, and essentially he had only improved upon other's work.

There was one main competitor in the light bulb race - Joseph Swan, a British "Edison" who had been experimenting on the light bulb since 1848. By 1879, he had already installed light bulbs in homes and landmarks in England and by the early 1880's had started his own company. This was what caused the major court battle because of an apparent patent infringement. After a major court battle, the two inventors joined forces, forming Edison-Swan United and forcing all other competition out of business. But Edison had still claimed the victory, the title of "light bulb inventor."

"Spacey" Firsts

The space program holds many firsts for us. The first man in space, the first dog in space, the first man to play golf on the moon. Following is a list of American "spacey" firsts that might interest you:

- **The first American to travel space:** Alan Shepard Jr.
- **The first astronauts to land on the moon:** Neil Armstrong, Edwin "Buzz" Aldrin Jr., Michael Collins
- **The first astronaut in orbit:** John Glenn
- **The first astronaut to walk on the moon:** Neil Armstrong
- **The oldest astronaut to fly in space:** Story Musgrave
  (on Oct. 29, 1998 John Glenn is set to board the STS-95/Discovery and claim this "first.")
- **The first woman in space:** Dr. Sally Ride
- **The first EDA (spacewalk):** Dr. Katherine Sullivan
- **The first teacher in space:** Krista McCullogh
- **The first astronauts to ride a vehicle on another planet:** David Randolph Scott, James Benson Irwin
- **The first female shuttle commander:** Eileen Collins
- **The first astronaut to maneuver outside a satellite:** Edward Higgins White, II
- **The first astronauts in orbit to transfer from one spacecraft to another:** Russell Louis Schweickart, James Alton McDivitt

These moments in history and others can be found at NASA's website (www.nasa.gov). It's a site for teachers, a site for parents and a site for students! You can even talk to mission control or an astronaut during a space flight.

If you are interested in space, you can also check out your school or public library. You'll find numerous resources and books that describe space, space flights, even space food!

Surf the Net!

The internet is a new resource available to everyone. You can "surf the net" for information about your science project, Thomas Edison sites, and just about any topic related to this video. Good places to start are the following sites:

If NASA interests you -- www.nasa.gov
Will introduce you to the world of NASA. Within this website you can talk to mission control or an astronaut during space flights!

If you want to learn more about Thomas Edison, try these sites:

www.edison.rutgers.edu
A documentary about Edison and his papers.

www.nps.gov/edis/home.htm
A National Park Service page devoted to Edison museums.

www.edison-ford-estate.com
A guide to the Edison and Ford Winter estates.

www.tir.com/~quincy
Discusses Edison's early life in Port Huron, Michigan, the archeological search for his boyhood home and artifacts recovered.

www.hfmgv.org
A guide to the Henry Ford Museum/Greenfield Village/Edison Institute.

www.edisonbp.org
A website devoted to Edison's boyhood home.

Historical References

If you are looking for information about Edison, try contacting a museum or historical site devoted to preserving Edison's research and memory. The following is a list of prominent spots to check:

The Edison National Historic Site
Main Street and Lakeside Avenue
West Orange, NJ 07052
201-736-5050
This museum/historic site contains Edison's research library, Edison's estate and grave, the library, machine shop, chemical lab, a replica of the Black Maria movie studio, and archives of Edison's papers and records.

The Edison Winter Home
2350 McGregor Boulevard, Fort Meyers, FL 33901
813-334-3614
Edison's Florida estate contains the botanical garden where the inventor cultivated various plants used in his research, a chemical laboratory, and a museum.

The Henry Ford Museum and Greenfield Village
20900 Oakwood Boulevard, Dearborn, MI 48121
313-271-1620
The place of "Light's Golden Jubilee" in 1929, this site includes reconstructions of the Menlo Park Laboratory, the boarding house where his staff stayed, and a museum with exhibits of devices that originated with Edison.

Museum of Arts and History
1115 6th Street Port Huron, MI 48060
313-982-0891
This museum contains artifacts from an archeological investigation of Edison's boyhood home.

The Edison Birthplace Museum
9 Edison Drive, Milan, OH 44846
419-499-2135
This museum houses furniture, family memorabilia, and an exhibit of Edison's inventions.

Menlo Park Memorial Tower
Route 27 Edison, NY 08817
201-549-3299
This 131-foot-high tower, topped with a 14-foot-high light bulb, commemorates the site of Edison's Menlo Park Laboratory.

Con-Edison Energy Museum
145 East 14th Street New York, NY 10011
212-460-6244
Exhibits on early electric lighting are among the attractions at this museum, run by the New York City power company that still bears Edison's name.

Schenectady Museum & Planetarium
Know Terrace Heights Schenectady, NY 12305
518-382-7890
This museum includes exhibits of early General Electric products.

Thomas Edison Butchertown House
729 East Washington Louisville, KY 40202
502-583-8317
Edison stayed at this cottage during one of his stints as a telegrapher in Louisville. It contains Edison memorabilia and inventions, including a phonograph, cylinder records and early light bulbs.

Your Science Fair Project

Do you want to create the best science fair project ever?

CHOOSING A PROJECT -- First understand the pros and cons of the two kinds of projects:

The Experimental Project -- A project that tests, measures and/or develops a set of data. Science fair judges tend to like experiments because they show higher levels of analysis and the scientific method. An experiment can answer a question or test a hypothesis. For answering a question, the student asks why, what, where, which, what for or how concerning some phenomenon of interest and then develops an experiment to answer that question. For testing a hypothesis, the student states a position on some relationship -- states that some specific conclusion will be proven from a series of tests -- and then runs an experiment to test that position. Examples of both questions and hypothesis derived from those questions are shown in the box. In each case the hypotheses give direction and significance to the initial question.

Question -- What is the boiling point of water? Hypothesis -- the boiling point of water in our city is less than 212°F because we are at an elevation higher than sea level.
Question -- What is the pH of fresh water? Hypothesis -- The pH of water in the rivers of our city is more acidic than normal because of acid rain.

Experiments should result in a clearly defined data set. The key words are "clearly defined" -- keep the data set simple, if possible with only one or two variables. Present your work in tables and graphs. Graphs are very important.

The Demonstration Project -- This is the project that shows some extensive research into some topic of interest. This is typically a research study -- a synthesis of available knowledge on a topic. Information is collected from libraries, books, the internet and/or knowledgeable individuals and is placed in a report or display. A demonstration project can be interesting but lacks the rigor of experimental design and the testing of ideas. To be successful, the demonstration project should show that the student has learned something new. It should have a clearly defined area of research and information from a variety of research sources. The information should be condensed into a few easily understood relationships. This is an opportunity for a student to develop and improve research skills.

CHOOSING A TOPIC -- To select a topic, use your own interests as well as help from your friends. First, make a list of things that interest you about science. List everything in "brainstorming" style; that is, write down every possibility without concern for the final selection. Second, discuss your list with friends and teachers. Ask for input from everyone. Third, focus on a short list of 2 or 3 real possibilities, and from this make your final selection.

EXPERIMENTS AND RESEARCH -- Once you have an idea, start your research or experimentation immediately. Many procrastinate and then are forced to do hurried studies and sloppy experiments at the last minute. If possible, leave time to run your experiment twice so that you can learn from mistakes.

PRESENTING YOUR WORK -- The best research or experiment is of little value if the work is not communicated effectively. Here are some key points to consider in making your presentation:

Keep it Simple -- Keep your display or presentation in an easy-to-understand format. Use clear labels and a simple, clear design that immediately focuses on key points.

Tell a Story -- People love stories; so put your presentation into story form. In other words, tell how you started, what you learned, what it meant to you. Give your project meaning. Give it significance. But remember it should be a short story -- keep it simple and direct.

Shorten Understanding Time -- Make a presentation that can be understood in a matter of seconds. Within one minute a viewer should be able to grasp all the significant details. After one minute he should be able to tell someone else what you did. Test your presentation on friends or acquaintances, and note how long it takes them to understand. After one minute quiz them on what they saw and understood and then change the display and adapt it so that people see what you want them to see. For testing, choose people with common sense who will be honest with you. Constructive criticism is your helper, and honest critics are your friends.

Make the Presentation Speak For Itself -- When others look at your project, you may not be there to answer questions and help your audience understand; so make a display that tells the whole story with a simple clear message. While preparing your display, use the Eye Test. Have someone look at your presentation and watch his eyes. What did they look at first? Second? Third? Was it what you wanted the person to see? Develop a design that draws your viewer into seeing what is important.

Pictures and Graphs -- Two simple rules: pictures speak volumes and experiments should have graphs. Choose pictures that create vivid images -- just the right number of pictures, not too many. Choose a graph that immediately conveys your results.

Eliminate the Unimportant -- So much of what you have done is important to you -- but maybe not to others. What is critical? What is essential to convey your ideas and results? Respect your viewer's time and interest.

Science Fair Vocabulary

abstract A short written summary of the main points of a project, including the purpose, procedures, results and conclusions.

bar graph A type of graph in which comparisons are made through lines of differing lengths.

bias Prejudice; not keeping feelings or views separated from objective observation or actions.

conclusion Interpretation based on outcome of results. An answer to the question studied in the research.

control group A test group that shows "normal" conditions. This group typically has nothing done to it; so the results from analyzing the group show the standard case.

controls Factors that are not to be changed in an experiment. Variables that are to be controlled.

data Information gathered from your observations or measurements.

database The complete set of data and information from experiments or research.

dependent variable The factor that changes as a result of altering the conditions of an experiment. An independent variable operates by itself. A dependent variable is affected by changing some independent variable.

experiment A planned investigation.

experimental group A group of subjects to which variables are applied.

hypothesis Statement of an idea that can be tested experimentally. States what the experimenter believes will happen as a result of the experiment.

incandescent lighting Light produced by heat.

independent variable The item, quantity, or condition that is altered to observe what will happen; something that can be changed in an experiment without causing a change in other variables.

line graph Type of graph in which data or relationship are connected or highlighted with lines.

observation What one sees in the course of an experiment.

predict To determine the outcome of something before it happens.

probability The chance of something happening.

procedures Steps that must be followed to perform an experiment.

qualitative analysis Analysis made subjectively, without measurement.

quantitative analysis Analysis made objectively, with measurement.

raw data Experimental information that has not been processed, adjusted or synthesized in such a way as to focus on the relationships important for the conclusion.

scientific method Procedure to determine scientific truth. Typically involves the statement of an hypothesis, a set of experiments to prove or disprove the hypothesis and the formulation of conclusions from the experiments.

statistics A collection of facts and information and typically processed or placed into different classifications.

variable A condition that is changed to test the hypothesis, or a condition that changes as a result of testing the hypothesis.

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The movie *For All Mankind: The Secret of Thomas Edison* is a fictionalized account of an historical event. Some characters have been changed and others added for dramatic effect.

It is important to remember that the handbook and the video are part of interdisciplinary and multi-cultural studies of history, biography, literature, geography, tolerance, and intolerance and should be included in the broader scope of any curriculum.

Essay Topics

- Why would anyone want to be an inventor?
- Do people plan to be inventors?
- Is necessity really the mother of invention?
- How do people treat inventors?
- Find out about famous African-American inventors. Famous Hispanic inventors. Famous Asian-American inventors.
- In 100 words or less, describe the best way for you to become an inventor.
- Why is it necessary to patent your inventions?
- What century do you think has been the most important for inventions?
- What invention has had the most effect on your life?
- Cloning - is it an invention?
- What are some ethical or moral questions an inventor might face today? 20 years ago? 200 years ago? 100 years in the future?
- How much influence, both in regulating and funding, does the government have on inventions today?
- Where do inventors find funding to pursue their work?
- Why do you think certain inventions are embraced so readily at one time, but not at others. (For example, the hula hoop was popular in the 1950's, but rare in the 1990's.)
- Are inventors respected more before or after they have a successful invention?
- What kind of education do you think you need to become an inventor?
- To be an inventor, do you have to actually make the invention, or can you just come up with the idea?

Classroom Activities

For Older Students

- Pick one common invention (the paper clip, glue, a staple) and research the history behind the invention. What would the world be like if that had never been invented? What other inventions would have been affected if this common invention had never been made?
- Have the students produce an inventor newspaper. Just the front page of a newspaper may be enough for a small project. Allow two weeks or more for development of a full paper. This can be a traditional theme of the life and times of inventors or descriptions of new inventions.
- Pick one invention and work on a campaign for funding and pursuing that invention. Discuss why it's necessary. Give its benefits, detriments, etc.
- Take the inside of your classroom and find out who invented everything in it - the chalk, the electrical outlet, the overhead projector. Give each item to one child and have him research it. Then do a diorama of the room with each invention highlighted.
- Have each student pick an inventor and write a short monologue to present to the class. He could also write a biography of the inventor.
- How do you get a patent? Research the whole patent process.
- Find out about one inventor in the world of technology and computers. What did he contribute that has made a big impact on America today? Other examples might include inventors in the world of automobiles, the world of entertainment, the world of business, the world of medicine, or the military.
- What new technology is currently being invented? Have your students research the new technology, and then debate the pros and cons of this breakthrough. For example, have the class debate the merits of cloning or the space stations.
- What denotes success in inventing? Thomas Edison was not "successful" in his rubber experiments, but the advancements he made in the field helped lead to a new generation of rubber and plastics. Have the students research and debate how you weigh success in various fields of inventing.
- Have your students discuss their own persistence. How many failed inventions would it take before they quit?
- Assign each student to research an industry that one of Edison's inventions or work has affected. Discuss how this one man has influenced and affected almost every aspect of our lives in some way.
- Discuss perseverance. Ask the students to write essays about one time in their life when they had to persevere. Tell how the experience affected them and how it affected others' views of them. Allow them to share with the class if they would like.
- Ask your students about their favorite sport. Find out who invented it and a little bit about the history of the game. Their favorite toy? Their favorite instrument? Their favorite hobby?
- Have your class learn about accidental inventors individuals who discovered things by accident.

- Discuss the problems of being an inventor. For example, what problems would you face if you had been the one who invented gun powder? The yo-yo? The paper clip?

For Younger Students

- Have your students imagine a life without inventions. For example, describe a life without electricity, a life without the telephone, a life without television. The possibilities are endlessa life without sneakers, a life without cameras, a life without ball point pens, etc.
- Have your students create their own inventions. These should be real ideas and inventions to solve real problems. The teacher can hold an "invention fair" and let the students show off their new creations for parents and other classes.
- Family tree-have your students trace their family history. Can they find any inventors in their family tree?
- Learn about the inventors from other countries. For more focus, choose a continent and assign different countries on this continent to different members of your class.
- Recreate the famous night at Menlo Park when the light bulb was invented. Have the students write a short play and present it to other classes.
- Take a poll - Make a list describing the ten best inventions in the world and tell why. Ask ten other people and compare the results. Have the whole class compare the results and make a chart.
- Discuss perseverance. Talk about what it means to stick with something to the end. Have your students write about one time in their lives when they practiced persistence.
- If you could invent something to make your life easier, what would you invent? To make your parent's life easier? To make your teacher's life easier?
- Work on teamwork. Divide your class into "teams" and give each group the assignment of creating a new invention.

Video Quiz

1. Name two of Mr. Edison's inventions.

2. What was Mr. Edison's middle name?

3. True or False: Thomas Edison invented electricity.

4. What's another name for Mr. Edison's "Talking Machine"?

5. Mr. Edison invented the kinescope. What did that invention do?

6. What was a "mucker"?

7. What was located in Menlo Park, New Jersey?

8. Finish Mr. Edison's famous saying that the Librarian quoted: "Genius is 1% inspiration and 99% _____."

9. What is a filament, and why is it so important?

10. Mr. Edison discovered that he needed to try a filament that had a different kind of resistance. Was his new discovery using a filament that had low or high resistance?

Essay Questions

1. In your opinion, what was the secret to Thomas Edison's success?

2. Evaluate Edison's famous quotation: "Genius is 1% inspiration and 99% perspiration."

3. How can you apply the lesson of teamwork from this movie to your life?